Mosaic genome structures of interspecific banana cultivars shed a new light on banana domestication.

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Abstract:

Many banana cultivars are interspecific hybrids between *M. acuminata* (Genome A, 2n=22) and *M. balbisiana* (Genome B, 2n=22). They are triploid, sometimes diploid, seedless and parthenocarpic clones selected by early farmers and since then dispersed by centuries of vegetative propagation. Cultivars were classified into genomic groups based on their morphological similarities to wild diploid species and their ploidy level; the main groups being referred to as 'AA', 'AB', 'AAA', 'AAB', and 'ABB'. They were further classified into subgroups based on agronomic characteristics.

We analyzed the A/B chromosomes composition of interspecific banana hybrids of various ploidy. All accessions had the expected euploid genome structure (i.e. 2, 3 or 4 sets of each chromosome for the 2x, 3x, and 4 x accessions, respectively). Interestingly, in all the interspecific cultivars that we studied, we identified a mosaic A/B chromosomes structure resulting from A/B interspecific recombination.

For the two diploids cultivars, the results showed an AB chromosome constitution, with some regions of AA origin. In the triploid cultivars, we observed various level of mosaic that suggested several steps of meiosis in their history. The tetraploid AAAB breeding accession also showed a mosaic of fragments from A and B genome along the chromosomes.

Based on analysis of the A/B mosaic pattern in cultivars, we propose new hypotheses on interspecific banana domestication.